WHAT IS CLAIMED IS:

1. A method for constructing a synthetic polynucleotide from which a polypeptide is producible to confer a selected phenotype upon an organism of interest or part thereof in a different quality than that conferred by a parent polynucleotide that encodes the same polypeptide, the method comprising: (a) selecting a first codon of the parent polynucleotide for replacement with a synonymous codon, wherein the synonymous codon is selected on the basis that it exhibits a different phenotypic preference than the first codon in a comparison of phenotypic preferences in test organisms or parts thereof, wherein the test organisms are selected from the group consisting of organisms of the same species as the organism of interest and organisms that are related to the organism of interest; and (b) replacing the first codon with the synonymous codon to construct the synthetic polynucleotide, wherein the selected phenotype is other than a phenotype conferred upon a cell by a polynucleotide that is expressed in the cell and that encodes the polypeptide.

2. A method according to claim 1, wherein the phenotypic preferences of codons in the test organisms or parts are compared by: (i) separately introducing into the test organisms or parts individual synthetic constructs, each of which comprises a regulatory polynucleotide operably linked to a tandem repeat of a codon fused in frame with a reporter polynucleotide that encodes a reporter protein, which produces, or which is predicted to produce, a corresponding phenotype selected from the group consisting of the selected phenotype and a phenotype of the same class as the selected phenotype; and (ii) comparing the quality of the phenotypes displayed by the test organisms or parts to determine the relative phenotypic preferences of the codons.

3. A method according to claim 1, wherein the reporter protein produces the selected phenotype.

4. A method according to claim 1, wherein the reporter protein does not produce the selected phenotype but produces the same class of phenotype as the selected phenotype.

5. A method according to claim 3 or claim 4, wherein the reporter protein is selected from antigens derived from pathogenic organisms, cancer antigens, self antigens, transplantation antigens, growth factors, hormones and toxins.

6. A method according to claim 1, wherein the phenotype is selected from immunity, antigen tolerance, angiogenesis, anti-angiogenesis, amelioration of clinical symptoms, reduced or increased cell death, reduced or increased cell differentiation, reduced or increased cell proliferation, tumour or cancer regression, growth and repair of tissue or organ, decreased fibrosis, inhibition or reversal of cell senescence, increased or reduced cell migration, differential expression of protein between different cells or tissues of an organism or part thereof, trauma recovery, recovery from burns, antibiotic resistance or sensitivity, herbicide tolerance or sensitivity, starch biosynthesis or modification, fatty acid biosynthesis , disease

resistance or tolerance, pest resistance or tolerance including insect resistance or tolerance, viral resistance or tolerance, fungal resistance or tolerance, a metabolic trait including sucrose metabolism, frost resistance or tolerance, stress tolerance, and improved food content or increased yields.

7. A method according to claim 1, wherein the phenotype is an immune response.

8. A method according to claim 7, wherein the immune response is a humoral immune response.

9. A method according to claim 7, wherein the immune response is a cell mediated immune response.

10. A method according to claim 7, wherein the immune response is an innate immunity mediated response.

11. A method according to claim 1, wherein the synthetic constructs are introduced into the test organisms using the same or similar mode of introduction.

12. A method according to claim 1, wherein the synthetic constructs are introduced into the test organisms at the same or corresponding site.

13. A method according to claim 1, wherein the organism of interest is a mammal and the synthetic constructs are introduced by oral, intravenous, intramuscular, intranasal, buccal, subcutaneous, transdermal, buccal or sublingual route.

14. A method according to claim 1, wherein the synthetic constructs are introduced into one or more of cell or tissue types of the organism of interest.

15. A method according to claim 14, wherein the synthetic constructs are introduced into cells selected from muscle cells, skin cells, brain cells, lung cells, kidney cells, pancreas cells, cells of a reproductive organ, heart cells, vascular cells, liver cells, eye cells, flower cells, meristematic cells, root cells and leaf cells.

16. A method according to claim 1, wherein the tandem repeat of each of the synthetic constructs comprises at least three copies of the corresponding codon.

17. A method according to claim 1, wherein the synonymous codon is selected such that it has a higher phenotypic preference than the first codon.

18. A method according to claim 17, wherein the synonymous codon is selected when the quality of the phenotype conferred by the synthetic construct comprising a tandem repeat of the synonymous codon is at least about 5% higher than the quality of the phenotype conferred by the synthetic construct comprising a tandem repeat of the first codon.

19. A method according to claim 1, wherein the synonymous codon is selected such that it has a lower phenotypic preference than the first codon.

20. A method according to claim 19, wherein the synonymous codon is selected when the quality of the phenotype conferred by the synthetic construct comprising a tandem

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repeat of the synonymous codon is at least about 5% lower than the quality of the phenotype conferred by the synthetic construct comprising a tandem repeat of the first codon.

21. A method according to claim 1, wherein the organism of interest is unicellular.

22. A method according to claim 1, wherein the organism of interest is a multicellular organism.

23. A method according to claim 22, wherein the multicellular organism is an animal.

24. A method according to claim 22, wherein the multicellular organism is a mammal.

25. A method according to claim 22, wherein the multicellular organism is a plant.

26. A method according to claim 1, wherein the synthetic constructs are introduced into progenitors of the test organisms or parts and the progenitors are grown or cultured for a time and under conditions sufficient to produce the test organisms or parts, whereby the synthetic constructs are contained in one or more cell types of those organisms or parts.

27. A method according to claim 26, wherein the progenitor cells are selected from stem cells, pluripotential cells, meristematic cells and embryonic callus.

28. A method for determining the phenotypic preference of a first codon in an organism of interest or part thereof, the method comprising: (a) introducing a synthetic construct into a test organism or part thereof, wherein the test organism is selected from the group consisting of an organism of the same species as the organism of interest and an organism that is related to the organism of interest, the synthetic construct comprising a regulatory polynucleotide operably linked to a tandem repeat of the first codon fused in frame with a reporter polynucleotide that encodes a reporter protein, which produces, or which is predicted to produce, a selected phenotype or a phenotype of the same class as the selected phenotype; and (b) determining the quality of the corresponding phenotype displayed by the organism or part, wherein the selected phenotype or the phenotype of the same class as the selected phenotype is other than a phenotype conferred upon a cell by a polynucleotide that is expressed in the cell and that encodes the polypeptide.

29. A method according to claim 28, further comprising: comparing (i) the quality of the corresponding phenotype displayed by a test organism or part thereof to which a synthetic construct comprising a tandem repeat of the first codon was provided; and (ii) the quality of the corresponding phenotype displayed by a test organism or part thereof to which a synthetic construct comprising a tandem repeat of a second codon was provided, wherein the second codon encodes the same amino acid as the first codon, to thereby determine the phenotypic preference of the first codon relative to the phenotypic preference of the second codon in the test organism or part.

30. A method according to claim 28, further comprising: (1) introducing the synthetic construct into a progenitor of a test organism or part thereof; and (2) producing the test organism or part from the progenitor, wherein the test organism or part contains the synthetic construct.

31. A method according to claim 28, further comprising: (1) introducing the synthetic construct into a progenitor of a test organism or part thereof; and (2) growing the test organism or part from the progenitor; wherein the test organism or part comprises a cell containing the synthetic construct.

32. A method according to claim 28, further comprising: introducing the synthetic construct into a selected cell of the test organism or part.

33. A synthetic polynucleotide constructed according to claim 1 or claim 28.

34. An organism of interest or part thereof containing a synthetic polynucleotide constructed according to claim 1 or claim 28.

35. An organism of interest or part thereof containing a synthetic construct that comprises a regulatory polynucleotide operably linked to a tandem repeat of a first codon fused in frame with a reporter polynucleotide that encodes a reporter protein, which produces, or which is predicted to produce, a selected phenotype or a phenotype of the same class as the selected phenotype in the organism or part, wherein the selected phenotype or the phenotype of the same class as the selected phenotype is other than a phenotype conferred upon a cell by a polynucleotide that is expressed in the cell and that encodes the polypeptide.

36. A method of modulating the quality of a selected phenotype that is displayed by an organism of interest or part thereof and that results from the expression of a parent polynucleotide that encodes the polypeptide, the method comprising: introducing into the organism or part a synthetic polynucleotide that is distinguished from the parent polynucleotide by the replacement of a first codon in the parent polynucleotide with a synonymous codon that exhibits a different phenotypic preference than the first codon in the organism or part, wherein the selected phenotype is other than a phenotype conferred upon a cell by a polynucleotide that is expressed in the cell and that encodes the polypeptide.

37. A method of enhancing the quality of a selected phenotype that is displayed by an organism of interest or part thereof and that results from the expression of a parent polynucleotide that encodes the polypeptide, the method comprising: introducing into the organism or part a synthetic polynucleotide that is distinguished from the parent polynucleotide by the replacement of a first codon in the parent polynucleotide with a synonymous codon that exhibits a higher phenotypic preference than the first codon in the organism or part, wherein the selected phenotype is other than a phenotype conferred upon a cell by a polynucleotide that is expressed in the cell and that encodes the polypeptide.

38. A method of reducing the quality of a selected phenotype that is displayed by an organism of interest or part thereof and that results from the expression of a parent polynucleotide that encodes the polypeptide, the method comprising: introducing into the organism or part a synthetic polynucleotide that is distinguished from the parent polynucleotide by the replacement of a first codon in the parent polynucleotide with a synonymous codon that exhibits a lower phenotypic preference than the first codon in the organism or part, wherein the selected phenotype is other than a phenotype conferred upon a cell by a polynucleotide that is expressed in the cell and that encodes the polypeptide.